The Maryland Fruit Grower

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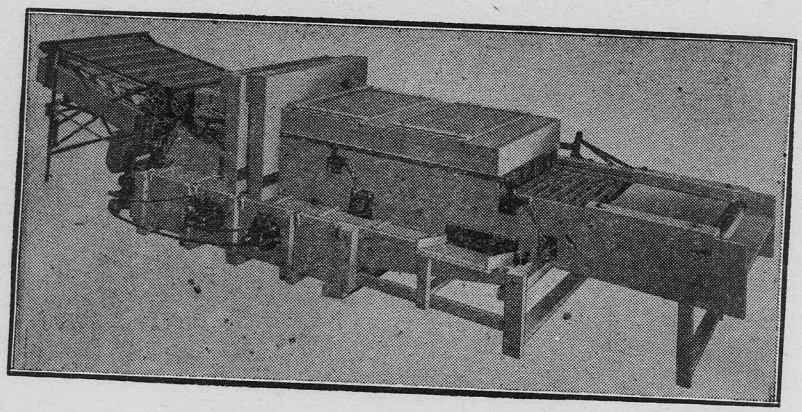

FRUIT WASHERS

The present-day fruit washer should not only remove all spray residues, but all other residues from the surface of the fruit, including dust, dirt, aphis and leaf hopper blemishes, in fact, everything that detracts from the appearance of the fruit.

The buying public is demanding clean food. Bright clean fruit creates a desire in the mind of the prospective purchaser and increases consumption. This increased consumption of apples means more satisfactory net prices to the grower.

The Cutler-Moe Fruit Washer not only removes all residues mentioned above, but imparts a beautiful finish to the natural wax of the fruit. This bright appearance should not only bring better prices, but also quicker sales which, in years of heavy crops, is an all-important factor.

Fruit Washers - Fruit Wipers - Brush Cleaners

JOHN BEAN MFG. CO.

Division Food Machinery Corporation

Lansing, Mich.

San Jose, Calif.

JUST AMONG OURSELVES

A. F. VIERHELLER, Extension Horticulturist

It May Help

Recent issues of "New York Packer" carried news items which might be summarized as follows:

The growers at Winchester, Virginia, decided to market their Transparent apples and other early varieties only when they were fit for human consumption.

California peach growers cooperated with the Canners League, and probably over a million dollars worth of peaches will be bought on a certain price basis, and left on the trees. This will help control the canned peach pack, and insure growers against future losses.

After quite a few small Georgia peaches brought the inglorious price of 35 to 50 cents a bushel, the State Commissioner of Agriculture passed a minimum size ruling. This ruling requires that in order to grade S. N. No. 1 varieties must have minimum sizes as follows: Carman 1⅞ inches; Hiley 1¾ inches; Georgia Belle 1⅞ inches; Elberta and Hale 2 inches. This ruling is not being well received by some growers, and may be revised.

Illinois growers claim to have thinned as high as 4,000 peaches from some trees.

Later Estimates

According to the "New York Packer," July 10, crop estimates indicated an expected 8,000 car decrease in apples, and a 3,000 car decrease in the pear crop under 1930, in the Washington-Oregon section.

The West Virginia "Mountaineer Grower" states that limited reports show an expected 80% increase in the West Virginia apple crop, over the rather short crop of 1930, while Virginia will have about twice the 1930 crop. This will be the usual average Virginia Crop, it is stated.

Picking and Packing Equipment

Have you looked over your picking equipment? A foolish question, but if you've ever pulled out picking bags, and found them full of holes and mouse nests, or with worn out ropes, broken hooks or straps, you can realize what it is like to lose time in repairs or in waiting for new bags to be ordered. What kinds of picking utensils are best? Well, it depends upon the grower. Some pickers don't like certain types of utensils, but here is where the grower should be boss. There are side and front picking bags, front picking buckets, and padded baskets or buckets, of bushel type or half bushel capacity. On large trees, probably the bushel type would add to speed of picking, but may increase bruising of picked fruit. Don't get "set in your ways" but try out some different types of bags or

buckets. Look over the picked fruit. Watch the pickers in action. Remember the words in the U. S. grades, "carefully hand-picked" and "free from unhealed broken skins and bruises." Then make any necessary changes in equipment or methods, to meet these qualifications. By the way, make pickers and packing house employees keep their finger nails cut close. Here's where we get some punctured fruit.

How about ladders? Are they in repair? Are they safe? A man can pick better if he feels that he is not going to dive out of the top of a tree, and he will be more careful of fruit that is picked.

Of course, we will caution the pickers not to "dump" the apples into the field crates, and we'll haul it carefully to the packing house.

And here's a fashion hint. Pads are again in style. Try some on your grader.

Most of our early apples have shown indications of rather good handling, but watch out for Grimes. It's a "bruiser" and advertises its bruises. If you don't think so, look at your inspection certificates or commission statements.

Check up on your picking and packing equipment, but don't fail to check up on your picking and packing operations. You've spent all summer in growing a good crop, and its a shame to spoil it all in a few minutes of rough handling.

* * *

THE SUMMER MEETING AND FIELD DAY

On Wednesday, July 22, with ideal weather, the Maryland State Horticultural Society held its annual summer meeting. Over 80 cars formed the tour, the crowd of over 225 people assembling at the fine, new packing house of J. Andrew Cohill, near Hancock. The crowd inspected the packing house, and also saw the Trescott Brusher and the new Bean 2-Way Cleaner in action. The insect field laboratory of the Maryland State Department of Entomology was then visited, and a tour was made through the great peach section, visiting the Fulton, Daniels, Clenallen, and Marvania orchards. A stop was made also at the Marvania packing house. After lunch, Mr. Sam Dillon entertained the touring party, showing his packing house, storage house, spray plant and orchard irrigation plant. Moving on to Tonoloway, through the Dillon and Caspar orchards, an inspection was made of the irrigation and fruit color experiment plots. Then at Tonoloway packing house, the Cutler Moe washing machine was shown in action. It was a good-natured, interested crowd, and there was plenty to see. Well, we're sorry if you missed it, for they all pronounced it a "great day." We were pleased to welcome several visiting growers from Virginia, West Virginia, Pennsylvania and New York.

NEW PROBLEMS IN FRUIT STORAGE

By J. R. MAGNESS, United States Department of Agriculture

(continued from last month)

Time of Picking in Relation to Variety and Climate

In connection with this discussion of the determination of the time of picking apples, it is well to mention the results of some recent cooperative investigations carried on by the United States Department of Agriculture and several experiment stations. These investigations have included the time of ripening and ripening changes of several varieties of apples when grown under the widely varying climatic conditions prevailing in the different apple-growing sections of the United States. It has been rather surprising to note that the different varieties apparently have about a constant length of growing season which is, to a considerable extent, independent of the exact climatic conditions which prevail. For example, Baldwin apples are usually ready to pick in about 135 to 140 days from blossoming time whether they are grown in Virginia, New York State, or in Massachusetts. Grimes Golden, Jonathan and Delicious usually require about 140 to 145 days while Winesap will require 160 days to reach prime picking condition.

It is interesting to note in this connection the strong correlation between the length of the growing season in any section and the varieties that are well adapted. A group of short-growing season varieties, including Tompkins King, Baldwin, Northern Spy, McIntosh, and Rhode Island Greening, is adapted only to the northern and eastern sections of the United States where the growing season is short. If these varieties are grown in the southern states or the Pacific Northwest under a long-growing season, they will mature in early September and will be early fall varieties.

On the other hand, varieties such as Winesap, Yellow Newton, Arkansas Black, and York Imperial require a long-growing season and are well adapted to the Southern States and the Pacific Northwest. If grown under short-season conditions, these varieties will be very hard, small, and usually of poor quality when picked. In order to have fruit suitable for best storage holding, it is essential that the varieties be grown under climatic conditions which are favorable to the best development of these particular varieties.

Ripening of Fruit in Storage

It happens only too frequently that fruit of high grades and quality, well grown, and picked in the proper condition, is of poor quality when it reaches the consumer. After the fruit is picked, it passes through a softening or ripening process. The tissues become much softer, the starch present changes over to sugar, and there is a decrease in the acidity of the fruit. At the time the fruit is picked, it is usually too firm for prime eating condition. As it softens, however, it finally reaches the condition at which it is at its very best for dessert purposes. This is when the variety is still moderately firm and crisp though of course far softer than when picked. If the fruit does not reach the consumer at that time, it gradually becomes mealy, dry, and somewhat insipid in flavor. Unfortunately, the latter condition is that in which only too great a proportion of our apples reach the

ultimate consumer.

Extensive investigations during the past three years have indicated that the rate of softening after the fruit is picked is dependent almost entirely upon the temperature at which it is held. Varieties, of course, differ greatly in the length of time that they will hold up under various temperatures but in any single lot of fruit the rate of ripening apparently depends almost entirely upon the temperature of the storage. The rate of ripening of about fifteen of the most important commercial varieties of apples when held in storage under a wide range of temperatures has been accurately determined by following the softening of the fruits by the pressure test method. The results of these investigations may be summarized as follows:

At 30° F. about one-fourth longer time is required for the fruit to reach a certain degree of ripeness than is required if the fruit is held at 32° F. Fruit at 40° F. ripens fully twice as fast as at 32° F. Fruit at 50 F. on the average ripens fully twice as fast as at 40° F. while fruit at 70° F. ripens fully twice as fast as at 50° F. Thus it is apparent that one day at 70° F. ripens the fruit as much as eight to ten days at 32° F., or about 12 days at 30° F. It is apparent also if fruit is to be held for a long term in cold storage and then is to reach the consumer in the most desirable condition, it must be moved to storage promptly following picking. A delay of one to two weeks at picking time under the temperature conditions prevailing at that season will often result in a shortening of the possible cold-storage season of at least two months. We cannot urge too strongly that if a fruit is to be handled through cold storage, it should be moved to cold storage at the earliest possible moment after picking and packing. Once there, it should be cooled as promptly as possible and held at a uniform temperature of 30 to 32° F. if best results are to be secured. The condition of the fruit in storage may then be carefully followed and when it reaches an eating ripe condition it should, if possible, be placed in the hands of the consumer at once.

Handling Apples in Common Storage

The handling of apples through common or air-cooled storage presents problems quite different from those prevailing when the fruit is handled in artificial cold storage. The results of very extended investigations have indicated that about the lowest temperature which can usually be maintained in air-cooled houses is the temperature approximating the average outdoor shade temperature. In other words, the average temperature of any locality as reported by Weather Bureau observers will give a fairly satisfactory measure of the average temperature which can be expected with fairly good management in an air-cooled storage house.

Recent investigations have shown that apples ripen much more rapidly after being removed from the tree and held under the prevailing temperatures than they do while remaining attached to the tree. Thus it appears that most varieties of apples will ripen less while remaining on the tree than if picked and placed in air-cooled storage. During the past two years, apple varieties in New York have been firmer at any given time during the winter if left on the tree until late than was fruit from the same trees picked early and placed in air-cooled storages. Except for varieties which

tend to develop Jonathan breakdown or flesh collapse in storage, it is apparent that leaving on the tree as late as possible is desirable if the fruit is to be handled in air-cooled storage. For the varieties which are well adapted to common storage holding, such as Ben Davis, Northern Spy, or Baldwin in New York State, or York Imperial, Winesap, or Albemarle Pippin in the southern states, or Winesap, Yellow Newtown, and Arkansas Black in the northwestern states, it is apparent that delaying picking until the fruit begins to drop considerably or until appreciable water core is developing, will result in the best common storage product. This delayed picking results in a shorter exposure to the relatively high temperatures which prevail in air-cooled storages before cold weather comes on, making possible the cooling of the fruit to temperatures corresponding to those obtainable in cold storage.

The condition of the fruit, whether in cold storage or air-cooled storage should be carefully followed by the owner. It is believed that the pressure test furnishes an excellent method of following the condition of the fruit through the storage season and a number of commercial fruit handlers are now adopting this method. Storage at low temperatures can only delay the ripening processes and if the consumer is to be supplied with high-grade fruit, it is important that it reach him before it has become over mature or mealy. This can only be accomplished by picking the fruit as nearly as possible at the proper date, keeping it at the lowest possible temperature either in cold or in common storage, and then placing it on the market before it reaches that condition of over maturity which makes poor-quality fruit even out of the best of our apple varieties.

* * *

THE EFFECTIVENESS OF OILED WRAPS IN THE CONTROL OF STORAGE DISEASES OF APPLES

H. H. PLAGGE AND T. J. MANEY, Iowa State College, Ames, Iowa

In the United States, the growing of apples is the most important operation in the horticultural industry. The value of the average yearly apple crop may be placed at about 250 million dollars. About 18 million bushels of the best of this crop is placed in cold storage annually and becomes the host of various storage diseases which frequently lessen and occasionally destroy the value of a considerable portion of the holdings.

Of the various troubles which develop on stored apples, Apple-scald is the commonest. It may become evident in storage but usually does not make its appearance until after the apples are exposed on the market. Dealers and customers are familiar with the disease but growers in general have little acquaintance with it.

Apple-scald is a superficial brown discoloration of the skin of the apple. It usually involves only the surface layers of the fruit. Scald manifests itself in various ways. It may occur in small spots on only a small portion of the surface or over the entire surface giving the fruit a tinted brown appearance which is extremely noticeable

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Extensive investigations during the past three years have indicated that the rate of softening after the fruit is picked is dependent almost entirely upon the temperature at which it is held. Varieties, of course, differ greatly in the length of time that they will hold up under various temperatures but in any single lot of fruit the rate of ripening apparently depends almost entirely upon the temperature of the storage. The rate of ripening of about fifteen of the most important commercial varieties of apples when held in storage under a wide range of temperatures has been accurately determined by following the softening of the fruits by the pressure test method. The results of these investigations may be summarized as follows:

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and objectionable on fruit exposed for sale.

A trace of scald not only detracts from appearance but to the well-informed buyer it is danger signal for the severe attack which is likely to develop in a few days under market conditions. When scald appears, it is not safe to wait and a sale is usually made immediately regardless of prices. At this point the grower who has been holding his fruit for better prices becomes broadly educated on the subject of Apple-scald.

For the past 25 years the attention of investigators has been directed to the study of scald. The pioneers in this endeavor were Powell and Fulton of the United States Department of Agriculture who found that fruit picked at the proper maturity scalded less than immature fruit; that well-colored apples scalded less than poorly colored ones; that immediate storage at 32 degrees F. resulted in much less scalding than did immediate storage 36 degrees F. and that fruit delayed in reaching storage was much more susceptible to the development of scald than that stored immediately. Subsequent investigators including Beach, Clark, Eustace, Greene, Ramsey, McKay, Markell, Bird, Brooks, Cooley, Fisher, Whitehouse, Marble, Magness and Burroughs have in the main corroborated the results of these early investigators and have added new chapters to our knowledge on the subject.

A few of the early investigators, perhaps with the idea in mind that scald was in some way connected with the loss of moisture from the apple, employed various tissue wraps in their investigations for the purpose of reducing evaporation. In general, the reduction in the amount of scald through the use of these wraps was not sufficient to warrant their recommendation on a commercial scale.

It is to Brooks, Cooley and Fisher of the United States Department of Agriculture that the credit is due for the discovery and development of the Oiled Wrap as a control for apple-scald. In 1919 the apple, employed various tissue wraps in their investigations dealing with the use of various oils and waxes for the control of scald. They found that apple-scald could be partially controlled by ventilation or forced aeration and came to the conclusion that its cause was probably due to some volatile substance which could be carried away by air currents or be taken up by certain absorbents. They found that injuries apparently identical with scald could be produced by exposing apples to the vapors of various esters and other substances which were the odorous products thrown off by apples in the process of evaporation.

It was found that scald was reduced by coating the fruit with thin films of oil or better still by wrapping with oiled wrappers carrying at least 15 per cent of their weight in odorless mineral oils. The value of the oil wrap was thought to depend upon the ability of the oil to absorb the odorous substances thrown off.

These findings have been corroborated by the work of various investigators, and the evidence that oiled wraps are efficient in the control of apple-scald is attested to by the fact that a large per-

centage of all the boxed fruit from the Northwest is being wrappepd in oil wraps, which in a large measure, are preventing apple-scald to the satisfaction of dealers and buyers.

The Pomology Section of the Iowa Experiment Station, Ames, Iowa, has been engaged in cold-storage investigation for the past 20 years. Many angles of the scald question have been studied including the effect of soil treatments, maturity, time of storing, aeration, ventilation, temperature, humidity and wraps. It has been found that the commercial oiled wrap containing 15 to 20 per cent of mineral oil has been the most effective single agency in the control of apple-scald.

With cold-storage apples including such bad "scalders" as Grimes, Sheriff and Mammoth Black Twig, scald has been reduced from 50 per cent bad scald, where common tissue wraps were used, to zero with oiled wraps. This fruit was taken from cold storage February 1, and allowed to warm up for four days at a temperature of 60 degrees F. before examination. In a common storage experiment where temperatures varied for the season from 29 degrees to 60 degrees F., bad scald has been reduced from 75 per cent with the common wrap to zero, with the oiled wrap.

It is a well-known fact that apples packed in tight barrels scald worse than apples packed in boxes. It is not practical to wrap apples for barreling, and here again the industry has been helped out of a bad situation by Brooks and Cooley who experimented with and perfected a shredded oil paper which can be distributed throughout the barrel while the apples are being packed. The above investigators, using Grimes, Mammoth Black Twig, York Imperial and Ben Davis, found that the shredded oil paper reduced bad scald from 45 to 90 per cent with untreated fruit to 0 to 11 per cent where shredded oiled paper was used at the rate of 1½ pounds per barrel.

At the Indiana Experiment Station, Baker has reported on some interesting experiments where shredded oil paper was used in packing barreled apples. Unwrapped Grimes developed scald after two months in storage and by the end of the normal-storage period for the variety were worthless. Early in January comparable lots wrapped in oiled paper were free from scald while the fruit packed with shredded oil paper showed only a slight trace. After two years of trial under Indiana conditions using barrels and baskets in cold and common storage, the statement is made that the shredded oil paper has reduced scald to such a small amount that it has ceased to be a factor worth considering.

In our own experimental work, we have found that shredded oiled paper, used at the rate of 8 ounces to the barrel had practically controlled scald. In cold storage, dealing with barreled Grimes, Sheriff, and Mammoth Black Twig, shredded oiled paper gave the following percentage of bad scald respectively, .0; 1.7; 15.6; without shredded paper, the respective percentages were 19.4; 56.3; 69.5.

In is true that apples picked at just the right maturity and stored at 32 degrees F. will remain practically free from scald but

it is so difficult to determine maturity and maintain proper conditions of storage that the only safe insurance in dealing with apple-scald is the use of the oiled wrap or shredded oil paper which can be added at low cost per package.

In some experiments which we have carried on with Grimes in which time of picking was considered, it was found that fruit picked on September 22 placed immediately in cold storage at 32 degrees F. developed 44.7 per cent scald by January 30. Fruit picked one week later and handled under the same condition was entirely free from scald on the same date. In each case the fruit was warmed up out of storage for four days before examination.

Oiled paper is recommended for the control of scald alone and should not be considered a cure-all for the many storage troubles. It will not control Jonothan-spot, soft-scald or internal breakdown. However, the oiled wraps or shredded paper do reduce excessive loss in moisture and bring storage stock through the season in a fresh, unshriveled condition which is an important consideration and one which in itself alone might justify their use.

Reprint from 1930 Proceedings—Missouri State Horticultural Society

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